



AUTOMATED VARIAC VAR 3005

USER MANUAL

601-320H

TESE

Advanced Test Solutions for EMC

AUTOMATED VARIAC VAR 3005

USER MANUAL

CONTENTS

1	Introduction	7
1.1	General description	7
1.2	Automated variable transformer VAR 3005 series	7
1.3	Differentiation of VAR 3005-S and VAR 3005-D	8
1.3.1	The VAR 3005-S automated single variac	8
1.3.2	The VAR 3005-D automated double variac	9
2	Safety instructions	10
2.1	General	10
3	Installation	13
3.1	Installation of a EUT power emergency off switch	13
4	Applicable safety standards	15
5	First step	16
6	Installation of the VAR 3005	17
6.1	Stacking of unit	17
6.2	Mounting in a 19" rack	18
6.3	Connecting the units	18
7	Main frame descriptions	20
7.1	Front panel VAR 3005	20
7.1.1	LED indicator	20
7.1.2	Manual EUT power IN switch	21
7.2	Rear panel	22
7.2.1	Units mains power input and power switch	22
7.2.2	EUT power input/output supply	22
7.2.3	EUT power recognition	23
7.2.4	EUT power fuse	24
7.2.5	Signal routing card "system in interface"	24
7.2.6	Signal routing card "system out interface"	24

8	User interface setting	25
8.1	Mains power quality (PQT) dips & interrupts	25
8.1.1	Using the VAR 3005-S	25
8.1.2	Using the VAR 3005-D	26
8.1.3	Monitoring screen	27
8.2	Sample graphs of variation test	27
8.3	Sample graphs of dips/interrupts	30
9	Technical data VAR 3005-S and VAR 3005-D	32
10	Maintenance and function check	34
10.1	General	34
10.2	Cleaning	34
10.3	Function check	34
10.4	Calibration	35
11	Warranty	36
12	CE conformity	37
13	System limits	39
14	Addresses	40



Lethal danger from high voltages and the risk of radiating illegal electromagnetic interference.

The NSG 3040/3060 with its VAR may only be installed and used by authorised and trained EMC specialists (electrical engineers).

The NSG 3040/3060 with its VAR must only be used for EMC tests as set down in these operating instructions.



Personnel fitted with a heart pacemaker must not operate the instrument and must not be in the vicinity of the test rig while it is in operation.

Lethal danger from high voltages and the risk of high levels of electromagnetic radiation being generated.

The system may only be operated by trained and authorised specialists.

The system must only be used for EMC test purposes as set down in these operating instructions.

When the system is used in conjunction with options, accessories or other equipment the safety instructions concerning those devices must also be observed.

If a circuit breaker module is incorporated in the system then the EUT supply voltage will be switched off.

1 INTRODUCTION



1.1 General description

The NSG 3040/3060 test system with its accessories is designed primarily for cable-borne transient interference tests as specified in the European generic standard IEC/EN 61000-6-1 covering equipment for household, office and light industrial use, and IEC/EN 61000-6-2 for applications in industrial environments, in accordance with the requirements of the basic standard. IEC/EN 61000-4-4, -5, -12 as well as -8 and -9 and the power quality test called IEC/EN 61000-4-11.

The EU Directive No. 89/336/EEC (for the assignment of the CE symbol) refers back to this standard for this type of equipment.

1.2 Automated variable transformer VAR 3005 series

The automated variable transformer series VAR 3005 is a standard accessory for the Teseq NSG 3040 and NSG 3060/CDN 3061 instrumentation. In combination with a PQT module it provides a convenient means for reducing the incoming supply voltage by adjusting the incoming EUT supply voltage to arbitrary voltages. It is required for power quality testing (PQT) dips and interrupts and is compliant with the latest revision of IEC/EN 61000-4-11 including the variation test.

The VAR 3005 units are fully automatic controlled, driven from NSG, using the touch panel interface SUI or the WIN software application.

To prevent incorrect testing, the phase, neutral and earth line of EUT IN power line is observed and the 50/60 Hz frequency range will be set automatically. This feature helps especially in case where "cycle" parameter is set in a test procedure.

Once detected by the NSG, all functions offered by VAR 3005 are available as well as the possibility to switch EUT power on/off.

The VAR 3005 can be connected either via a NSG 3040 with its internal coupling device or via the NSG 3060 in combination with a CDN 3061 and the built in power quality (PQT) module. The EUT input frequency will be detected automatically for a correct synchronisation of the PQT events.

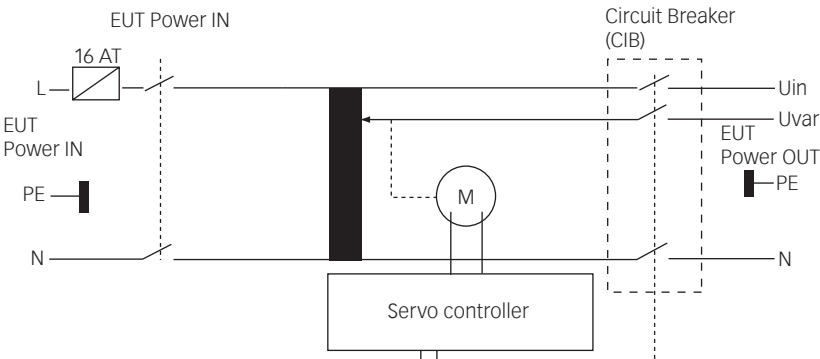
1.3 Differentiation of VAR 3005-S and VAR 3005-D

Depending on ordered unit, the variac is labelled either with VAR 3005-S or VAR 3005-D. The S-type stands for single variac while the -D stands for double variac. The -S type has one variac built in, while the -D version comprises two independent variacs.

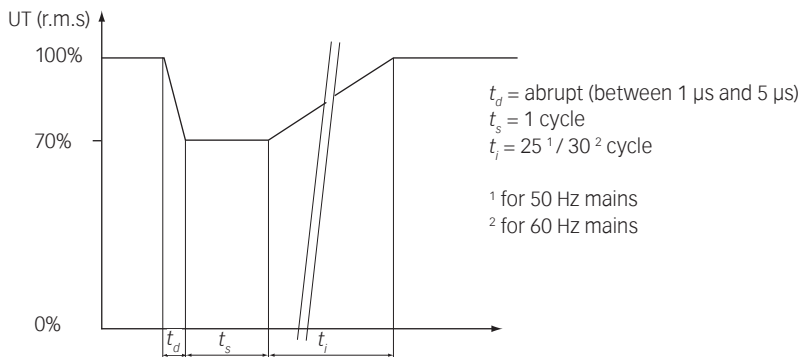
1.3.1 The VAR 3005-S automated single variac

The VAR 3005-S is an automated single variac rated for 16 A, 265 VAC. Once detected, the settings of the variation voltage U_{var} will be possible in Volts or % of mains voltage, to set the recommended value given in the standard like 0, 40, 70 or 80% or any other value settings are possible.

Circuit diagram VAR 3005-S



The recommended standard variation test can be performed by setting the variac to 70%. The PQT switch from the NSG will switch (abruptly) to the 70% level and then the variac will increase the voltage up to the 100% (U_{in}) values.

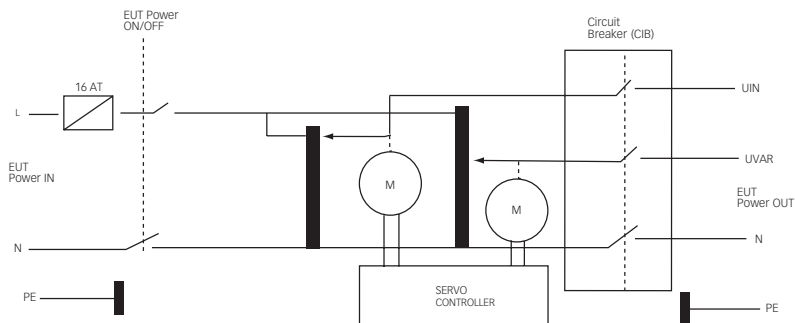


1.3.2 The VAR 3005-D automated double variac

The VAR 3005-D is an automated double variac, each rated for 16 A. Two variacs allow to set Uvar as well as the Uin parameter. This allows for example to test 110 V EUTs from 230 V mains.

Once detected, the settings of one variation voltage Uvar will be possible in Volts or % of Uin, while Uin can be freely set. The Uvar for the recommended value can be given in the standard like 0, 40, 70 or 80%. Any other value settings in % or in volts are possible.

Circuit diagram VAR 3005-D



The variation test with the double variac has the advantage to set the 100% (Uin) voltage to any desired value without disconnecting the EUT mains or set manually to another voltage, while the 70% value is positioned by the second variac.

2 SAFETY INSTRUCTIONS



The variac VAR 3005 is intended for use with conducted generators. These generators produce high voltage test pulses with high energy.



Improper or careless handling can be fatal! The instrument must only be used by trained personnel.

These operating instructions together with the generator manual, form an essential part of the equipment and must be available to the operator at all times. All the safety instructions and advice notes are to be observed.

Neither Teseq AG, Luterbach, Switzerland, nor any of the subsidiary sales organisations can accept any liability for personel, material or consequential injury, loss or damage that may result from improper use of the equipment and accessories.

2.1 General

Use of the variac with its accessories in combination with the generator is restricted to authorized and trained specialists.

The user is directly responsible for ensuring that the test rig does not cause excessive radiated interference which could affect other instrumentation. The test system itself does not produce any excessive EM radiation. However, the injection of interference pulses into a EUT can result in it and/or its associated cables radiating electromagnetic energy.

To avoid problems with unwanted radiation the standards organisations recommend that the test rig is operated inside a Faraday cage.

Automated variac VAR 3005

Warning symbols on the test system:



**CAUTION! Warning of a danger spot
(refer to the documentation).**



Caution! Warning of electrical hazards!



Because of its type of construction the instrument is not suitable for use in an explosive atmosphere.



Persons fitted with a heart pacemaker must not operate the instrument nor approach the test rig while a test is being executed.

Only approved accessory items, connectors, adapters etc. are to be used to ensure safe operation.



Upon switching on the generator, it will perform a self test. This includes the detection of the EUT input power for synchronisation. Therefore the EUT output is to be considered as carrying EUT power at all times!

The test rig must provide adequate insulation protection. Particular care should be given to the connections between the VAR and the equipment under test (EUT).

The EUT may only be tested when placed inside a suitable protective enclosure which should provide protection against flying fragments, fire and electric shock.

The pulse voltage must not be able to find its way to unearthed metal objects in the event of the EUT failing.

Only use the instrument in a dry room.



The front and rear handles of the unit are not made for continuous use. The handle are made for removing the unit from the shipping box or sporadic repositioning. The unit has to be placed on a table or cart beside the generator.

Never leave the instrument unattended when the EUT is switched on.

Do not open the instrument. Repairs and adjustments must only be carried out by qualified maintenance personnel.

Do not continue to use the VAR should any mechanical damage occur. Return the damaged VAR to a Teseq service center immediately for repair.

3 INSTALLATION



The test system conforms to protection class 1. Local installation regulations must be respected to ensure the safe flow of leakage currents.



Operation without a protective mains earth connection is forbidden!

Two independent protective earth connections are necessary (for the test system and the EUT). These must be connected back to the local permanent installation or to a fixed, permanent protective earth conductor.

Operate the equipment only in dry surroundings. Any condensation that occurs must be allowed to evaporate before putting the equipment into operation. Do not exceed the permissible ambient temperature or humidity levels. Use only officially approved connectors and accessory items.

Make sure to have free access to all switches on the front and rear panel.

3.1 Installation of a EUT power emergency off switch

The VAR itself has an internal EUT circuit breaker to control EUT power ON/OFF, accessible via the user interface or the software, but nevertheless, it is recommended to connect the EUT power through a properly rated circuit breaker and an emergency off button as per IEC 61010-1:2001. In order to ensure an easy and quick access, the button should be located close to the test setup and should be clearly and visibly labelled as a device for "Emergency EUT power ON/OFF" switching.



The test setup should only be accessible to trained persons.

Dimensioning of mains supply and rating of fuse protection of AC power supply must conform with National prescriptions and EUT requirements.

Inappropriate arrangement, mounting, cabling or handling of the device under test or the protective elements can make the protective features that are in the design incorporated of the instrument worthless.

4 APPLICABLE SAFETY STANDARDS

15



The construction of the instrument conforms to the safety requirements and offers everything necessary for safe and efficient operation.

Development and manufacturing are in compliance with ISO 9001. The system complies with the safety requirements of IEC/EN 61010-1 (Safety requirements for electrical equipment for measurement, control and laboratory use).

The interference immunity has been tested in accordance with EN 60326-1. It is the user's responsibility to ensure that the test rig does not emit excessive electromagnetic interference (EMI) which might affect other items of equipment.

5 FIRST STEPS



This chapter contains a short checklist with steps that should be taken before the instrument is connected to the generator or coupling device and switched on and put into operation.

Check the packaging for signs of damage in transit. Any damage should be reported immediately to the transportation company. Due to the weight of the VAR 3005-D, a two man lift is needed to prevent injury. Lift the VAR 3005 out of its packaging by taking hold of the front mounted grips.

Check, using the following list, that all the items ordered as well as their accessories have been delivered:

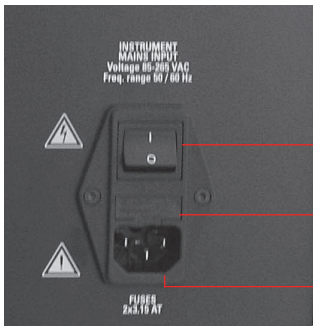
1. VAR 3005 unit
2. User manual
3. 1 Mains power cable for the VAR
4. 1 System cable
5. Ordered options

6 INSTALLATION OF THE VAR 3005

17



The mains power voltage indicated on the instrument must accord with the local supply voltage (mains voltage: 85 to 265 VAC, universal power unit, mains frequency: 50 to 60 Hz).



■ Mains switch

■ Fuse-holder with fuses 2 x 3.15 AT

■ Mains power supply

To insert a fuse, pull the fuse-holder out of the connector, insert 2 fuse cartridges 2 x 3.15 AT (slow blow) into the holder and put the holder back.

Plug the mains cable into a power outlet with a solid earth connection. Take note of the polarity of all input and output connections.

Place the test system in such a way that there is sufficient free space around the cooling air inlets.

6.1 Stacking of unit

Depending on units we recommend following mounting possibility:

NSG 3040

Leave the NSG 3040 on the table with the proper earth connection for Burst/ Surge and place the VAR on top of the NSG 3040.

NSG 3040 and CDN 3063

The CDN should be placed on the table while the NSG is on top of it. The VAR can be placed on the NSG 3040 but we recommend to place it beside the NSG and CDN especially for the –D version.

NSG 3060/CDN 3061 and CDN 3063

In this case the VAR has to go beside the CDN and NSG otherwise there is a risk of falling apart. To be flexible we recommend also to built the units into a rack.

6.2 Mounting in a 19" rack

For system use, i.e. when the NSG 3040/3060 test system is to be combined with other equipment, it can be useful to mount the instrument in a 19" rack. The width of the unit fits the 19" rack system and the height is 7HU.

For ordering information please refer to the section "Accessories".

6.3 Connecting the units



The equipment should be switched off during installation and interconnection. EUT power switch on the VAR 3005 has to be switched off as well.

1. Connect the NSG/CDN instrument power into mains
2. Connect the VAR instrument power into mains
3. Remove 25 way Sub D plug at rear (termination plug) of NSG 3040 or CDN 3061 master controller
4. Connect the delivered system cable (25 way Sub D) to VAR System IN and the other end to NSG/CDN System OUT
5. Connect the termination plug to system OUT on VAR
6. Connect VAR 3005 - EUT power out to NSG or CDN - EUT power input
7. Connect VAR 3005 - EUT power into mains using EUT power in cable delivered with NSG or CDN

Automated variac VAR 3005



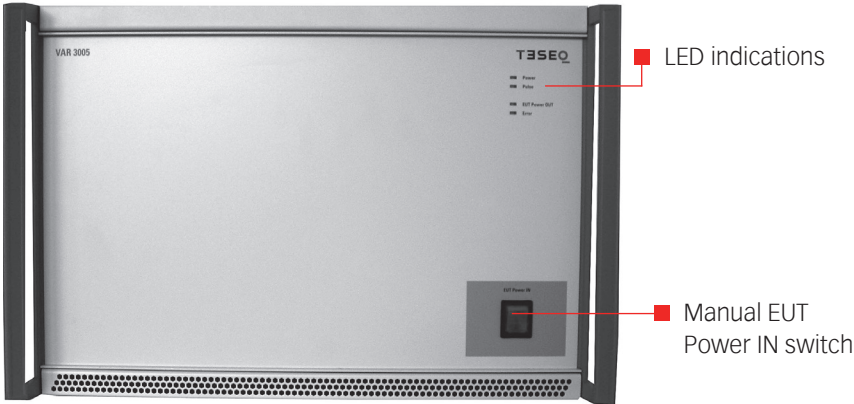
To ensure a proper recognition of the automated accessories and CDN, the generator is the final unit to be switched on. Wait at least 5 sec. before the NSG is switched on.

8. Switch on VAR 3005 first (wait 5 sec.)
9. Switch on CDN (if connected)
10. Switch on NSG last
11. Switch on EUT power (red switch) when power for the EUT is required

7 MAIN FRAME DESCRIPTIONS



7.1 Front panel VAR 3005



7.1.1 LED indicator

Five indicator LEDs serve to show the most important test system conditions. During the booting period the LEDs are swapping on/off.

LED indication	
Power	LED on: Shows if instrument is powered up
	LED off: VAR not power on. Verify instruments mains input or the fuses (2 x 3.25 AT)
Pulse	LED on: Shows the occurrence of a test (test running)
	LED off: No test is running

EUT Power IN Error	LED blinking: Power supply is not correctly connected. Verify phase, neutral and earth on the EUT IN connector.
	LED off: EUT power input correctly set
EUT Power OUT	LED on: EUT power IN is switched on and is working correctly.
	LED off: EUT power button in user interface or WIN 3000 not switched on.
	LED blinking: EUT power is not switched "ON" at the user interface or WIN 3000. Test can not be started.
Error	LED off: No problem - accessory is ready to run
	LED blinking: Indicates that performing of an action (CIB on or test start) is not possible because EUT Power IN is not available or voltage level or frequency is not ok.
	LED on: Problem which needs module repair – please contact your nearest Teseq customer support centre or sales representative.

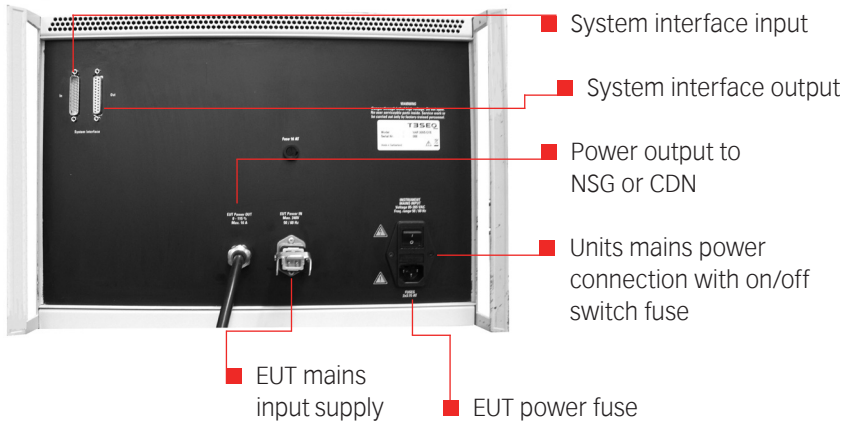
7.1.2 Manual EUT power IN switch

The manual EUT power switch serves to control the EUT power mains during the setup phase. This EUT power switch has to be on first to control the EUT power via user interface.



Never attempt to connect or disconnect an EUT while a test is being carried out.

7.2 Rear panel



7.2.1 Units mains power input and power switch

The main input is the power to the internal electronics of the VAR.



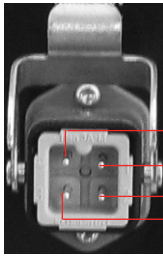
This connection must not be confused with the EUT power input.

The input contains the mains power input connector, the mains switch and the mains fuses.

7.2.2 EUT power input/output supply

The EUT power input

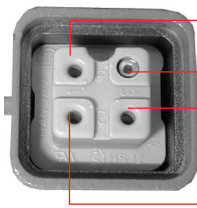
This is the connection point of the power supply for the equipment to be tested. The 4-pin connector is a special 16 A type. A counter plug with 2 m cable for feeding the EUT from a normal mains outlet is included in the NSG 3040 or CDN 3061 delivery package.



- Pin 4, GND = Earth
- Pin 1, L = Phase
- Pin 2, N = Neutral
- Pin 3 = Not connected

The EUT power output

The connector is comprised of the pole contact (La, No.1), while contact (Lb, No.3) is the variation voltage, the neutral return contact (N, No.2) and the earth connection to the EUT.



- Pin 1, La = Phase
- Pin 4, GND = Earth
- Pin 3 Lb = Variation voltage
- Pin 2, N = Neutral

Wire colours and pin configuration

Black:	Phase	Pin 1(La)
Blue:	Neutral	Pin 2(N)
Red or brown:	Variation voltage from VAR 3005	Pin 3(Lb)
Green/yellow:	Earth	Pin 4(GND)

7.2.3 EUT power recognition

The EUT power IN has to be connected correctly; otherwise the CIB switch of the VAR will not switch on. This is a safety feature to prevent incorrect testing since the frequency will be detected automatically, phase, neutral and the earth connection have to be set accurately.

For a proper EUT power input, the voltage has to be between 10 VAC and 250 VAC. The frequency depends on EUT power IN voltage*. If one of the parameter is not correct, the LED indication on the front of the unit will show it, and the EUT power will not be feeded.

* see technical data

7.2.4 EUT power fuse

To protect the variac and the EUT against over current malfunction, the unit has two different fuses.

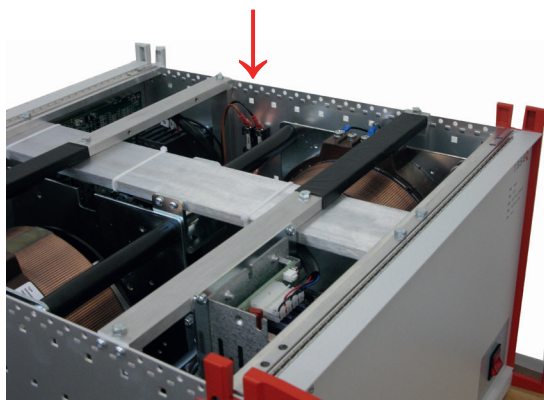
EUT power In fuse:

Fuse link 5mm x 20 mm ($\frac{1}{5}$ " x $\frac{3}{4}$ ") 16A slow blow, located on the backplane

EUT power Out fuse:

VAR 3005-S16 to protect Uvar, fuse link, 6.3mm x 32mm ($\frac{1}{4}$ " x 1 $\frac{1}{4}$ "), 1 x 25A slow blow, located in the VAR 3005 (see picture below).

VAR 3005-D16 to protect Uvar and Uin, fuse link 6.3mm x 32mm ($\frac{1}{4}$ " x 1 $\frac{1}{4}$ "), 2 x 25A slow blow, located in the VAR 3005 (see picture below).



7.2.5 Signal routing card "system input interface"

This is for the system interface between generator and the accessories. This "System in" connector needs a link to the "Master controller" of the generator. The system cable is part of the delivery.

7.2.6 Signal routing card "system output interface"

This connection is used, if additional automated accessories need to be connected. Otherwise the termination plug has to be connected and the screws need to be tightened. The termination plug is part of the generator.

Automated variac VAR 3005

8 USER INTERFACE SETTING

25



The PQT test involves the emulation of mains voltage dips and brief interruptions as specified in the international standard EN/IEC 61000-4-11.

The generator causes disturbances on the EUT supply line that is brought out to the EUT power outlet socket of the 1-phase CDN. A dip has occurred when the nominal voltage falls by a significant amount during a certain number of cycles. The standard specifies dips of 20, 30 and 60% (i.e. the voltage falls to 80, 70 and 40% of the nominal level respectively).

8.1 Mains power quality (PQT) dips & interrupts

An interruption occurs when the supply voltage disappears completely for a certain number of cycles (or falls to a value less than 20% of its nominal voltage).

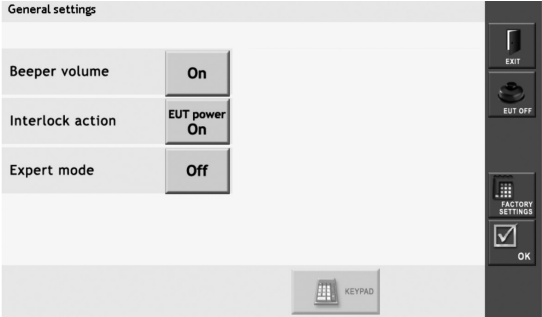
Note: Dips and interrupts appear on the phase (L) line only.

8.1.1 Using the VAR 3005-S

Voltage Uin setting in general setting

This voltage parameter has to be measured at the power mains socket which will be used for EUT power input before executing a test. The measured value needs to be entered in the "Voltage Uin" field using the keyboard or the turning wheel.

This parameter is the 100% reference point used for dips & interrupts tests. This parameter has to be set before a test has to be performed; otherwise the value given in % may be wrong.

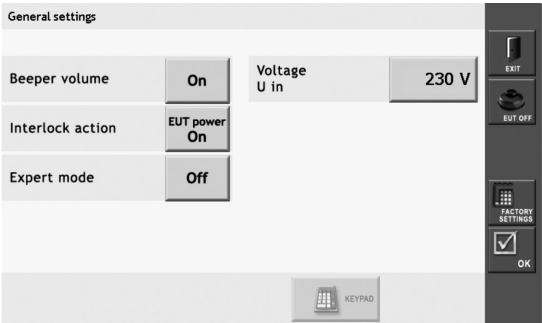


The voltage taken from the mains power socket may vary, depending on countries area and seasons.

Therefore it is important to measure the mains voltage with a regular digital multi meter and add this value in Uin-Field to get accurate test results.

8.1.2 Using the VAR 3005-D
Voltage Uin setting in general setting

This voltage parameter can be set according the test setup needs. This parameter will be the 100% reference used for dips & interrupts tests. This parameter has to be set before a test has to be performed; otherwise the value given in % may be wrong.

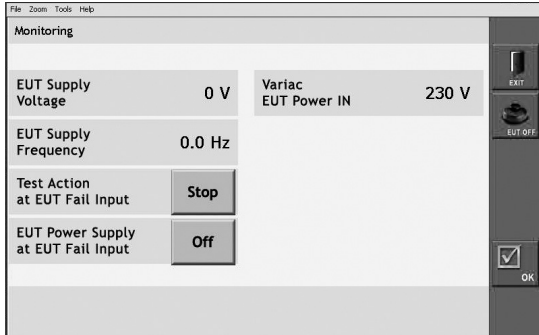


The Uin voltage can be change anytime in “Stop”-mode.

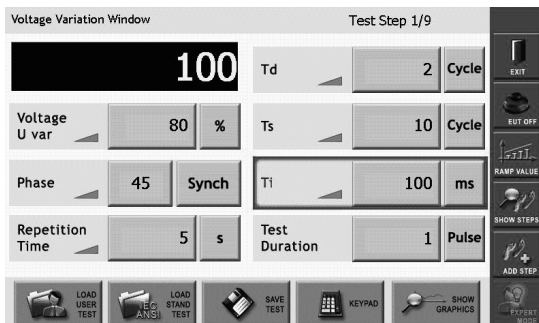
Automated variac VAR 3005

8.1.3 Monitoring screen

The monitoring screen is acting differently in NSG 3040 or NSG 3060. In NSG 3040 only the EUT supply frequency will be shown, while in the NSG 3060 additional the EUT supply voltage will be exposed, if EUT power is switched on.



8.2 Sample graphs of variation test



Voltage U Var

If no automatic variac or automatic transformer is connected, then the voltage dip or interrupts will always occur to 0%. As soon a VAR is connected and touching the units repetitively, it will change from % to **Volts**.

If a manual voltage source is connected, then the dips/interrupts level will follow the manually set voltage at the EUT input.

Phase

Touching the phase field, it will come up with a red frame to indicate the selected parameter being ready for change. The value can be modified either with the red wheel or using the keypad. Touching the Synch/Asynch button it will change repetitively. In synch mode the angle can be modified either with the red wheel or by using the keypad. Synch mode is only available if the EUT power (AC) is connected and switched on.

Repetition time

Touching the repetition time field, it will come up with a red frame to indicate the selected parameter being ready for change. The value can be modified either with the red wheel or by using the keypad. Touching the units repetitively will change from **s, min, cycle, µs** to **ms**.

Td, Ts, Ti

Touching the Td, Ts and Ti time field, it will come up with a red frame to indicate the selected parameter being ready for change. The value can be modified either with the red wheel or by using the keypad. Touching the units repetitively will change from **ms, s, to cycle**. To fulfil standard specification only Td can be set to "Abrupt" which means a switch off to the set Uvar voltage.

Td = Decreasing time

Ts = Time at reduced voltage

Ti = Increasing time

In cycle mode, the unit will detect the frequency as following:

45 Hz - 54.9 Hz → 50 Hz

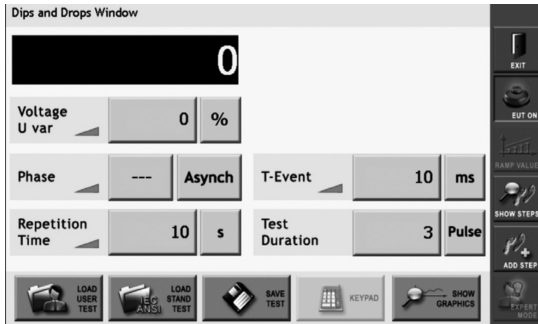
55 Hz - 65 Hz → 60 Hz

Test duration

Touching the test duration field, it will come up with a red frame to indicate the selected parameter being ready for change. The value can be modified either with the red wheel or by using the keypad. Touching the units repetitively will change from **pulse, cont, s** to **min**.

Parameter	Value
Uvar with optional variac:	up to 265 V (in 1 V steps) up to 115% of Uin (in 1% steps)
Phase synchronization:	asynchronous, synchronous 0° to 359° (in 1° steps)
Repetition time:	1000 ms to 35 min. 1 to 99'999 cycles
Decreasing time Td:	abrupt 1 ms to 5'000 ms 1 s to 5 s 1 to 250 cycles for 50 Hz 1 to 300 cycles for 60 Hz
Time at reduced voltage Ts:	10 ms to 10'000 ms 1 s to 10 s 1 to 250 cycles for 50 Hz 1 to 300 cycles for 60 Hz
Increasing time Ti:	10 ms to 5'000 ms 1 s to 5 s 1 to 250 cycles for 50 Hz 1 to 300 cycles for 60 Hz
Test duration:	1 s to 99'999 s 1 min. to 70'000 min. 1 to 99'999 pulse Continuous

8.3 Sample graphs of dips & interrupts



Voltage U Var

If no automatic variac or automatic transformer is connected, then the voltage dip or interrupts will always occur to 0%. As soon a VAR is connected and touching the units repetitively it will change from % to **Volts**.

If a manual voltage source is connected, then the dips/interrupts level will follow the manually set voltage at the EUT input.

Phase

Touching the phase field, it will come up with a red frame to indicate the selected parameter being ready for change. The value can be modified either with the red wheel or by using the keypad. Touching the Synch/Asynch button it will change repetitively. In synch mode the angle can be modified either with the red wheel or by using the keypad. Synch mode is only available if the EUT power (AC) is switched on.

Repetition time

Touching the repetition time field, it will come up with a red frame to indicate the selected parameter being ready for change. The value can be modified either with the red wheel or by using the keypad. Touching the units repetitively will change from **s, min, cycle, μ s** to **ms**.

T-Event

Test duration

Touching the “T-Event” field, it will come up with a red frame to indicate the selected parameter being ready for change. The value can be modified either with the red wheel or using the keypad.

Touching the units repetitively will change from **ms, s, cycle, 1/10 cycle** or **μs**.

Test duration

Touching the test duration field, it will come up with a red frame to indicate the selected parameter being ready for change. The value can be modified either with the red wheel or using the keypad. Touching the units repetitively will change from **pulse, continuous, s** to **min**.

Parameter	Value
Dips & interrupts:	From EUT voltage input to 0 V, 0% ⁽¹⁾
Uvar with optional variac:	up to 265 V (in V steps) up to 115% of U _{in} (in 1% steps)
Phase synchronization:	asynchronous, synchronous 0° to 359° (in 1° steps)
Repetition time:	μs: 40 ... 99'999 ms: 1 ... 99'999 s: 1 ... 1'999 min: 1 ... 35 cycle: 1 ... 99'999
Event time (T-Event):	μs: 20 ... 99'999 ms: 1 ... 99'999 s: 1 ... 1'999 cycle: 1 ... 300 1/10 cycle: 1 ... 3'000
Test duration:	s: 1 ... 99'999 min: 1 ... 70'000 pulse: 1 ... 99'999 Continuous

(1) Effective minimal dip voltage ~8 V. As specified in IEC 61000-4-11, chapt. 5.1 a test voltage level from 0% to 20% of the rated voltage is considered as a total interruption.

9 TECHNICAL DATA VAR 3005-S AND VAR 3005-D



Parameter	Value
Dimensions VAR 3005:	W: 449 mm (17.7") H: 328 mm (12.9", 7 HU) D: 565 mm (22.2")
Weight VAR 3005-S:	40 kg (88.2 lb) approx.
Weight VAR 3005-D:	57.5 kg (126.7 lb) approx.

Parameter	Value
Instrument supply:	85 to 265 VAC 50/60 Hz
Power consumption:	max. 150 W
EUT supply input voltage:	10 to 250 VAC (not suited for DC voltages)
EUT supply input current:	16 A
Input frequency:	45 to 65 Hz at 10 to 235 VAC 49 to 65 Hz at 236 to 250 VAC
EUT output voltage Uin: (only VAR 3005-D)	Adjustable up to 265 VAC
EUT output voltage Uvar: (dip voltage)	Adjustable up to 265 VAC or up to 115% of Uin
EUT output current:	16 A continuous for variac set to 100% Uin 20 A for 5 sec for variac set to 80 % Uin 23 A for 3 sec for variac set to 70% Uin 40 A for 3 sec for variac set to 40% Uin
Load regulation:	< 5% Uin, variac set to 100% Uin, 0 to 16 A < 5% Uin, variac set to 80% Uin, 0 to 20 A < 5% Uin, variac set to 70% Uin, 0 to 23 A < 5% Uin, variac set to 40% Uin, 0 to 40 A
EUT power input fuse:	16 A slow blow
EUT power output fuse:	1 x 25 A VAR 3005-S 2 x 25 A VAR 3005-D

Parameter	Value
Max. Motor speed for Uin regulation: (only VAR 3005-D)	1,64 s \pm 20% from 100% to 0%
Max. Motor speed for Uvar regulation:	1,64 s \pm 20% from 100% to 0%
EUT power IN on/off function:	Front panel switch
EUT power on/off:	CIB via user interface or WIN 3000
Fuse EUT supply:	16 A, slow blow
Connectors:	Harting type HAN3A, compatible with NSG or CDN safe linking concept
Possible extensions:	Interlock connection to door switch

Environmental conditions

Temperature range	
Operation at:	+10 to +40° C
Storage at:	-10 to +60° C
Humidity:	30 to 78% (non condensing)
Air pressure:	860 to 1060 hPa

10 MAINTENANCE AND FUNCTION CHECK



10.1 General

Inside the test system there are no adjustable elements accessible to the user for either calibration or maintenance purposes.

The housing of the test system must not be opened. Should any maintenance or adjustment become necessary, the whole test system, together with an order or fault report, should be sent in to a Teseq service center.

Maintenance by the user is restricted to cleaning the outer housing, performing a function check and verification of the pulse parameters.

10.2 Cleaning

In general a moist cloth is sufficient for cleaning the outer housing. In stubborn cases use a small amount of a mild, non-foaming household cleanser as well.

No chemicals should be used for cleaning purposes.

Before beginning to clean the test system ensure that it is switched off and the mains power cable is unplugged from the supply.

10.3 Function check



The safety measures described previously must be strictly observed while carrying out a function check.

As soon as the test system is switched on the Power-LED will light up after 3 - 5 s. If this is not the case then please check the mains power connection to the test system as well as the fuses and any other cabling.

The instrument automatically carries out a diagnostic routine once it has been successfully switched on.

The generator with its accessories cannot perform any tests while the interlock circuit is open.

Pulse generation can be observed at the output connectors by means of an oscilloscope. This is a practical way to check that the system is functioning correctly, but should never be used for reference or calibration purposes.

10.4 Calibration

Teseq has one of the few accredited test laboratories in Europe, Asia and USA that is in the position to undertake calibrations in this specialized field.

11 WARRANTY



Teseq grants a warranty of 2 years on this test system, effective from the date of purchase.

During this period, any defective component parts will be repaired or replaced free of charge or, if necessary, the test system will be replaced by another of equivalent value. The decision regarding the method of reinstating the functional capability is at the sole discretion of Teseq.

Excluded from the warranty is damage or consequential damage caused through negligent operation or use as well as the replacement of parts subject to degradation.

The warranty is rendered invalid by any intervention on the part of the customer or a third party.

The faulty items are to be returned in their original packaging or other equivalent packaging suitable for the purpose of the foreseen means of transportation.

Teseq can accept no responsibility for damage in transit.

12 CE CONFORMITY

37



TESEQ

Advanced Test Solutions for EMC

Teseq AG Nordstrasse 11F 4542 Luterbach Switzerland
T+41 32 681 40 40 F+41 32 681 40 48 www.teseq.com

Declaration of conformity



Manufacturer:	Teseq AG
Address:	Nordstrasse 11F, 4542 Luterbach, Switzerland
	declares that the following product
Product:	VAR 3005-S16 Automatic Single Variable Transformer VAR 3005-D16 Automatic Double Variable Transformer
Options:	all
	conforms to the following Directives and Regulations
	EMC Directive 2004/108/EEC LVD Directive 2006/95/EEC
Generic standards:	EN61326-1, 2005 EN61326-2-1, 2005 EN61010-1, 2001
	The relevant technical file is available for inspection:
Technical file:	N° EMC_VAR3005_2010 / LVD_VAR3005_2010 Teseq AG CH - 4542 Luterbach

The purpose of this instrument is the generation of defined interference signals for EMI immunity testing. Depending on the arrangement of the test rig, the configuration, the cabling and the properties of the EUT itself, a significant amount of electromagnetic radiation may result that could also affect other equipment and systems. The user himself or herself is ultimately responsible for the correct and controlled operation of the rig. In case of doubt, the tests should be carried out in a Faraday cage.

European representative:	Teseq GmbH, Landsberger Str. 255, 12623 Berlin, Germany
Place and Date:	Luterbach, February 1 st , 2011

Johannes Schmid
Präsident

TESEQ

Advanced Test Solutions for EMC

The equipment is CE certificated. The following standards apply:

Type of standard	Standard number	Remark
Product family standard	EN 61010	Safety requirements for electrical equipment for use in measurement, control, reation and laboratory applications
Generic standard	EN 61000-6-3	Electromagnetic compatibility (EMC); generic standard for interference radiation; Part 6.3 for residential, business and trade applica-tions as well as small businesses
Generic standard	EN 61000-6-4	Electromagnetic compatibility (EMC); generic standard for interference radiation; Part 6.4 industrial applications
Generic standard	EN 61000-6-1	Electromagnetic compatibility (EMC); generic standard for interference immunity; Part 6.1 for residential, business and trade applica-tions as well as small businesses
Generic standard	EN 61000-6-2	Electromagnetic compatibility (EMC); generic standard for interference immunity; Part 6.2 for industrial applications
Product family standard	EN 60326-1	Electrical equipment for measurements, control and laboratory use.

The requirements cannot be fulfilled in some cases. (The true purpose of an interference generator is to produce interference signals. Emission limitations can therefore only be complied with if the equipment is operated inside a Faraday cage).

Deviations from the requirements are stated and explained in the appendix to the conformity declaration.

13 SYSTEM LIMITS

39



Description:	Test system for EMC tests with mains-borne interference in accordance with the IEC/EN 61000-6-1 and -2 standards for burst, surge and mains quality tests. Operation software-wise via a PC link Ethernet TCP/IP interface or touch-screen of the NSG 30xx. Pulse output to external coupling networks. Housing for bench-top or rack use.	
Housing:	Bench-top housing made of metal. supplementary rack-mounting kit.	
Mains on/off:	On/off switch on rear panel of the instrument	
Indicator LED's on front panel:	Power:	LED, yellow
	Pulse:	LED, green
	EUT Power INError:	LED, red
	EUT Power OUT:	LED, green
	Error:	LED, red
Safety functions:	Main fuses, interlock, EUT fail input	
Ambient conditions:	+5° to 40°C, 20 to 80% relative humidity (non-condensing), 68 to 106 kPa atmospheric air pressure	
Self-test:	Routines for functional self-test	
Relevant safety standards:	IEC/EN 61010-1 safety requirements for electrical equipment used for measurement and control purposes as well as laboratory use	
Relevant EMC standards:	IEC/EN 6000-6-1 and -2; generic standards standards for electromagnetic interference immunity	

Headquarters

Teseq AG

4542 Luterbach, Switzerland

T +41 32 681 40 40

F +41 32 681 40 48

sales@teseq.com

www.teseq.com

Manufacturer

Teseq AG

4542 Luterbach, Switzerland

T +41 32 681 40 40

F +41 32 681 40 48

sales@teseq.com

China

Teseq Company Limited

T +86 10 8460 8080

F +86 10 8460 8078

chinasales@teseq.com

France

Teseq Sarl

T +33 1 39 47 42 21

F +33 1 39 47 40 92

francesales@teseq.com

Germany

Teseq GmbH

T +49 30 5659 8835

F +49 30 5659 8834

desales@teseq.com

Japan

Teseq K.K.

T +81 3 5725 9460

F +81 3 5725 9461

japansales@teseq.com

Singapore

Teseq Pte Ltd.

T +65 6846 2488

F +65 6841 4282

singaporesales@teseq.com

Switzerland

Teseq AG

T +41 32 681 40 50

F +41 32 681 40 48

sales@teseq.com

Taiwan

Teseq Ltd.

T +886 2 2917 8080

F +886 2 2917 2626

taiwansales@teseq.com

UK

Teseq Ltd.

T +44 845 074 0660

F +44 845 074 0656

uksales@teseq.com

USA

Teseq Inc.

T +1 732 417 0501

F +1 732 417 0511

Toll free +1 888 417 0501

usasales@teseq.com

© November 2013 Teseq®

Specifications subject to change without notice. Teseq® is an ISO-registered company. Its products are designed and manufactured under the strict quality and environmental requirements of the ISO 9001. This document has been carefully checked. However, Teseq® does not assume any liability for errors or inaccuracies.

To find your local partner within Teseq®'s global network, please go to **www.teseq.com**